

SAND

NOTE TO SPECIFIERS: For concrete work in the Kansas-Nebraska area, special changes and additions to this paragraph will be necessary. When preparing specifications for concrete work in this area, contact code D-1511, Engineering and Research Center, for specific requirements.

a. General. - The term "sand" is used to designate aggregate in which the maximum size particle will pass a 3/16-inch (No. 4) test sieve. Sand shall be predominantly natural sand which may be supplemented with crushed sand to make up deficiencies in the natural sand gradings. ¹(Crushed sand, if used, shall be produced by suitable ball or rod mill, or disk or cone crusher, so that the particles are predominantly cubical in shape and free from flat or elongated particles. Crusher fines produced by a jaw crusher used other than as a primary crusher shall not be used in production of sand. Crushed sand shall be blended uniformly with the natural sand by routing through the sand classifier.)

All sand shall be furnished by the Contractor from any approved source as provided in ¹(subparagraph d. below). ²[paragraph _____ (Production of Sand and Coarse Aggregate)]. ¹(Any royalties or other charges required to be paid for materials taken from deposits not owned by the Government and controlled by the Bureau of Reclamation shall be paid by the Contractor.)

Sand, as delivered to the batching plant, shall have a uniform and stable moisture content of less than 6 percent free moisture. Variations of moisture in sand as batched shall not exceed one-half percent in 30 minutes.

b. Quality. - The sand as batched shall consist of clean, hard, dense, durable, uncoated rock fragments. Sand may be rejected if it fails to meet any of the following quality requirements:

(1) Organic impurities in sand (ASTM designation: C 40). - Color no darker than the specified standard.

(2) Sodium sulfate test for soundness (Designation 19, Eighth Edition - Revised Reprint of the Bureau of Reclamation Concrete Manual). - ³(Eight percent maximum weighted average loss, by weight, after 5 cycles.)

(3) Specific gravity (ASTM designation: C 128 saturated, surfacedry basis). - ³(2.60 minimum.)

(4) Deleterious substances. - As shown in table _____ (Allowable percentages of deleterious substance in sand).

Table _____. - Allowable percentages of deleterious substances

in sand

Deleterious substances	Maximum percent, by weight, in sand as batched
Material passing No. 200 sieve (ASTM designation: C 117)	3
Lightweight material (ASTM designation: C 123 using a solution of zinc chloride)	2
Friable particles (ASTM designation: C 142)	1
Other deleterious substance (such as mica, coated grains, soft-flaky particles, and loam)	2
Maximum allowable sum of all the above deleterious substances	5

c. Grading. - The sand as batched shall be well graded, and when tested by means of standard sieves (ASTM designation: C 136), shall conform to the limits in table _____ (Sand grading requirements).

Table _____. - Sand grading requirements

Sieve No.	Individual percent, by weight, retained on sieve
4	0 to 5
8	5 to 15*
16	10 to 25*
30	10 to 30
50	15 to 35
100	12 to 20
Pan	3 to 7

* If the individual percent retained on the No. 16

sieve is 20 percent or less, the maximum limit for the individual percent retained on the No. 8 sieve may be increased to 20 percent.

The grading of the sand shall be controlled so that the fineness moduli (ASTM designation: C 136) of at least 9 out of any 10 consecutive test samples of finished sand will not vary more than 0.20 from the average fineness modulus of the 10 test samples.

¹d. [Test and approval. - ⁴(Bureau of Reclamation tests performed on samples of sand obtained from sources in the following locations indicate that these sources contained, when sampled, materials meeting the quality requirements of these specifications for sand:

- (1) _____.
- (2) _____.
- (3) _____.
- (4) _____.

All locations are listed relative to the _____ Meridian.)

Sand from sources ⁵(_____) above will not require the use of low-alkali ¹(cement) (or pozzolan meeting the alkali requirements) in accordance with paragraph _____ (Cement) or (Cementitious Materials).

If sand is to be obtained from a deposit not previously tested and approved by the Government, the Contractor shall assist the Government in collecting representative samples for preconstruction testing and approval. The samples shall consist of approximately 200 pounds of sand and shall be submitted to the Bureau of Reclamation, Code D-1511, Building 56, Entrance S-6, Denver Federal Center, Denver CO 80225, at least 60 days before the sand is required for use.

The approval of deposits by the Contracting Officer shall not be construed as constituting the approval of all or any specific materials taken from the deposits, and the Contractor will be held responsible for the specified quality of all such materials used in the work.

In addition to preconstruction testing and approval of the deposit, the Government may test the sand during the aggregate processing, but final acceptance of sand will be based on samples taken at the batch plant. The Contractor shall provide such facilities as may be necessary for procuring representative samples at the aggregate processing plant and at the batch plant.]

¹Delete when "Production of Sand and Coarse Aggregate" paragraph, Conc. 8, is used.

²Delete when "Production of Sand and Coarse Aggregate" paragraph, Conc. 8, is not used.

³Revise as advised by code D-1511.

⁴Delete when tested and approved sources are not to be listed. A listing will be prepared on request by code D-1511, Concrete Section.

⁵Indicate numbers. (If all sources require the use of low-alkali cement, state so.)

7-27-87 Revision: Revised subparagraphs b.(2). Other minor revisions.